Patient-Physician Relationship and the Role of Clinical Decision Support Systems

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LEARNING OBJECTIVES

1. Describe the patient-physician relationship.
2. Assess the current challenges of a healthy patient-physician relationship.
3. Evaluate the role of information technology in improving the relationship between patients and physicians.
4. Define the term clinical decision support system.
5. Discuss the benefits and challenges of clinical decision support systems.

ABBREVIATIONS: CDSS - Clinical Decision Support System, ICD - International Classification of Diseases, CPT - Current Procedural Terminology, SNOMED - Systematized Nomenclature of Medicine, HER - Electronic Health Records

INDEX TERMS: Patient-Physician communication, Practice of Medicine, Medical Errors, Information Technology, Clinical Decision Support System, Medical Coding Language, Legal and Ethical Issues of Information Technology

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INTRODUCTION

In the last quarter of the twentieth century rapid development in the biological, medical, and pharmaceutical sciences has taken place and is continually developing causing a considerable broadening and deepening in the medical knowledge and thus the emergence of new methods of examination and treatment of patients. There is high importance in the development of medical and technical sciences and as a result the amount of information needed by physicians in their practice for the diagnosis and treatment of various diseases has significantly increased. Using new and emerging drugs, diagnostics, and data from evidence-based medicine should help improve the clinical and cost effectiveness of care.

Definition of Patient-Physician Relationship

Physician-patient effective relationship is the main key to deliver good therapy and high quality healthcare in the medical field. Physicians and their communication, social and relational skills are the main pillars that help in collecting information and data from patients to facilitate precise and accurate diagnosis, and deliver effective care and therapy.[1] These skills are the most important practices in the medical and clinical field that will help reach the best healthcare outcome and patient gratification.[2] Furthermore, the physician-patient relationship has two main components: emotional and informational. Delivering successful medical care and intervention require strong physician-patient communication by establishing a partnership. Also, a patient has a great view about his or her medical situation or problem that will help him or her to be part of the decision making process.[3] Therefore, creating a good social and personal relationship, facilitating sharing and exchanging of medical and clinical data and information and patients participating in decision making are three main aims of physician-patient relationship.[4-5] Emotional components include genuineness, trust, respect, empathy, warmth and acceptance.[6] Informational (cognitive) components

include gathering of data and information, exchanging and sharing medical information, educating patients and providing quality medical management. Most of the patients' complaints and displeasure from the healthcare delivery are due to a breakdown of the relationship and communication between the physicians and patients.

Challenges Facing Physicians in Their Relationship with Patients

The practice of medicine is still a difficult area to be formalized, in which expertise in making decisions in many cases does not come so much from the analysis of objective data as with the previous professional experience and intuition. In such a situation it is difficult to avoid medical errors. The high demand for better healthcare is an issue of social and economic importance. The problem is substantially aggravated by the fact that a number of demographic and environmental factors (such as an increase in the elderly population, increasing pollution of the human environment, etc.) lead to the fact that physicians are increasingly not dealing with a patient's illness alone but with a combination of the above factors. As a result, there is a need to increase the magnitude of analysis, further complicating the task of selecting the appropriate treatment modalities which interact with one another. Ultimately, this leads to an increase in the number of medical errors in the diagnostic and treatment process. Physicians should strive to achieve the best clinical outcomes, while spending a reasonable minimum amount of resources. This causes a very urgent problem of information support for which a solution needs to be developed to meet the demands of the healthcare system.

Role of Information Technology in Patient-Physician Relationship

At the same time, there is a rapid development of information technology, leading to the improvement of various medical practices. Implementation of a convergence of modern information technology advances and practical medicine provides such a solution and is the aim in health informatics. Various systems and algorithms have been developed to support adoption of medical decisions that contribute to an improvement in diagnosis, prognosis and treatment and have proven effective for use in clinical settings.

Because of the large amount of data generated in healthcare, there is a growing need for the utilization of computer based systems. Existing database management systems allow for the storing, processing, and providing information to the user in a convenient form. Integration of statistical packages and databases on the principles of system analysis creates an effective decision support system for clinical purposes. Diagnostic support systems utilize data mining to discover relations within large sets of data.[1] This system is knowledge-based with integrated pattern recognition, statistical analysis, and complex algorithms with databases. By these means of analysis, data is converted into meaningful information.

Clinical Decision Support System (CDSS)

The computer based medical decision-support system is a program designed to help professionals make clinical decisions.[2] It is an interactive system that with correct use is better than the physician alone in making diagnostic decisions because of its capacity for information storage. The system retrieves many types of data such as medication, allergy, blood tests, electrocardiograms, demographic information, biopsy and hematological results, physical examinations, x-ray findings, dietary, surgical, microbiology and infection data. The integration of all these sources of data makes information more readily available to the physician. The utilization of stored information makes associations with symptoms or laboratory results to produce a diagnosis or suggestion, to give reminders, or to alert the finding of critical values. However, this does not replace the judgment of trained medical professionals. It serves as a guide for diagnosing conditions and aids in interpreting results by leading the clinician in the right direction.

The diagnostic complex gives labels to patient descriptors that are based on our current understanding and knowledge of diseases and conditions. Decision rules are usually set by IF/THEN programming where IF defines a set of conditions and THEN gives a set of decisions.[3] The program must be easy to use and allow for quick decision making. It should offer assistance, be inclusive of a complete set of actions and alternative options, narrow the selection and select the most accurate diagnosis, and must be either accepted by the physician or have the option to override the decision.

The structure of the decision support system should define symptom and data limit values based on clinically accepted values that are relevant to the input data.

It is essential that the system is frequently updated to include the latest research reflecting the "gold standard" in treatment.[4] A good diagnostic support system should be based on evidence-based diagnostic protocols for the implementation of the best practices.[5] In addition, a unified medical coding language such as ICD-9, CPT, or SNOMED should be used for standardization and definition mating between systems.[6] These coding languages standardize classifications, nomenclature, and vocabularies so that one system is compatible with another thus increasing interoperability between institutions.

Benefits and Challenges of CDSS

The diagnostic features of electronic health records (EHR) is one of the most useful tools for physicians; however, it is underutilized and clinicians often override or ignore a suggestion that could lead to improved care.[7] Despite its potential usefulness there is still a lack of widespread clinical acceptance.[8-9] The use of electronic health records has already been established and utilized in pharmacy and billing areas and is optimized for cost effectiveness and determining the necessity of treatment plans for insurance purposes.

Integrating a diagnostic support system with patient electronic health records establishes a connection between the patient's past medical history and the constantly growing clinical research to improve accuracy of diagnosis and to predict future events or trends in the patient's health. Using a diagnostic support system with electronic health records enhances clinical performance for drug dosing, preventative care, and other aspects of medical care.[10] This system supports and incorporates relevant clinical information from databases such as MEDLINE, PubMed, and other peer-reviewed electronic medical journals in which these findings from the medical literature integrated with patient-specific records can produce an evaluation or analysis to assist in the patient's care.[11-13]

The use of an EHR system with an integrated CDSS is a valuable resource for any health system in establishing high quality and safe practice of medicine from guidelines developed by evidence-based medicine.[11] An increasing number of studies show improved patient outcomes including improved diagnosis, reduction in medical errors associated with difficulty in diagnosis, and overlooked or incorrect diagnosis with the integration of a clinical decision support system with electronic patient health records.[12-13] The main problems that face developers of integrated health information systems include additional time expenditure and incorporation into the workflow, lack of formalization, conceptualization, and standardization, the ever expanding conceptual framework of medicine, and the need to simultaneously support the paper and paperless technologies and constant updating and maintenance.[14-17] Another challenge that comes with working with biological systems is large volumes and a variety of types of medical information that make the data range very extensive. Input can include symptoms, medical history, family history and genetics, and published protocol which all influence treatment effectiveness and patient outcomes.[16-17]

Technical issues can include the user interface: how easily can staff operate the system? Integration of information with all departments of the medical institution associated with the provision of diagnostic and treatment process, internal workflow, financial and economic activities, etc. and support for use in a wide variety in the level of medical facilities, from health units to large medical institutions is also another barrier to its successful implementation.[15-16] It is also important that the integration of information ensures the relevance, consistency and integrity of stored information. The basic idea is to provide medical personnel quick access to relevant information from any workstation. This means that any information passing through the hospital, entered into the information system and immediately after the update is available at any time to any expert of the institution with regard to the rights of access. To solve the problems of interaction with its units and other medical organizations, as well as communication with medical equipment, the system should maintain standards for the transfer of medical information. Another concern is that clinical decision support systems are not comprehensive enough to fully evaluate the case of a patient. The relationship between

variables and factors influencing a condition are not always known and may change.[16-17] The physician knows much more about the patient than what is input into the system and computers lack basic common sense and experience.[16]

Legal and ethical issues exist when dealing with information management. Regulation of access to medical information should be guaranteed an appropriate level of security. For storing and accessing information the most important aspects are accuracy and authorization. Access to certain data must be provided in accordance with the privileges of the user. Finally, with the decision support system generating diagnosis and suggesting treatment options, it should be determined who is liable for the patient outcomes. As previously stated, a clinical decision support system only serves as a guide for diagnosing conditions and aids in interpreting results. It is not a replacement for the medical opinion and experience of licensed physicians.

In this the new era of connectivity, increased information management and efficiency in the health system is made possible with advancing technologies and utilization of local, national, and global networks. The main goal is creating a unified information source for the health system in order to improve the validity of diagnostic decisions through the use of computational and analytical methods and models, thus developing an integrated information analysis system to improve the quality of care. Telemedicine is one technology that is growing and reduces the cost of the treatment process and improves the quality of care. This is achieved primarily due to the possibility of working with patient medical records and communication with the patient through the phone and Internet. One aim is to increase the level of reference and information services to healthcare institutions available to the general public by creating applications with public access via the Internet. Such systems can also be utilized to develop automated medical diagnostic devices. All of these systems would decrease the time needed with a physician and increase efficiency of medical services.

CONCLUSION

Physician-patient communication is the most important factor for delivering effective healthcare to the patients. This effective communication could be a source of support and motivation. Very often for medical decisions, lack of knowledge, time, and resources, lack of ability to attract competent experts, and incomplete information about the patient's condition leads to medical errors that result in poor healthcare outcomes. This suggests a need for specialized software systems for solving a variety of problems in healthcare settings. Modern information technologies could serve as the conduit to improve the quality and process of medical care. Therefore, the organization of information supported decision-making in healthcare based on standardization of evidence-based knowledge is essential in order to improve the clinical treatment, effectiveness of treatment, and improve overall patient safety.

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